Harvard Medical Alumni Bulletin

March April 1977

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Harvard Medical Alumni Bulletin

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Cover: Believe it or not, there is a 2600 year old man at the Massachusetts General Hospital. He stands quiescent and inscrutable in the shadows of the Ether Dome in the Bulfinch Building — an Egyptian mummy! How, you may ask, did an ancient Egyptian find a home in Boston's Back Bay? George E. Gifford, Jr., M.D., medical historian and antiquarian, meticulously unravels the mysterious case of the Ether Dome mummy in this rather anatomical issue of the *Bulletin*.

The case of the mummy — its sarcophagus, that is — was recently removed from its glass display case in the Ether Dome for a few moments to be photographed for our cover, while the mummy himself, looking remarkably well preserved, imperturbably observed the proceedings from his own glass case on the opposite wall. And now, to get down to cases, turn to page 5.

Speaking of Alumni Day . . .

"Plan ahead" is the motto of the reunion committee of the HMS class of 2001, which recently convened in the alumni office to plan the class's first reunion in 2006. The meeting was chaired by the future director of alumni relations (seated at the head of the table), who guided them in the preparation of the questionnaire for their class report and in the selection of a caterer for their clambake. These youthful and energetic alumni needed a little prodding to get down to business, but such a convivial group has seldom assembled in the alumni office. They have started making arrangements early, so that none of their classmates will miss Alumni Day, twenty-nine years hence.

Shall the little children lead you? Alumni Day is closer than you think (unless you're a member of the class of 2001).

SCIENTIFIC SYMPOSIUM: Thursday, June 2
ALUMNI DAY: Friday, June 3
REUNIONS: Thursday-Sunday, June 2-5

Bulletin Bazaar

For those who have a penchant for the institution of the classified ad, and would like them to be more plentiful in the *Bulletin,* we announce the inauguration of the **Bulletin Bazaar,** a regular column that will post inquiries and proposals for the usual and the unusual in goods and services. We hope to solicit a quantity of classified ads from alumni/ae and others that may run the gamut — from the rental or sale of sylvan retreats, to the exchange of abodes for those taking a sabbatical year, to the intrepid yachtsman/woman looking for racing competitors. Whatever your real or fanciful needs dictate, send us a description. If this can become a frequently patronized section of the *Bulletin,* we can perhaps start to turn around our waning advertising revenues, and also equilibrate the buyers and sellers among the 12,000 readers of the HMAB. There are just a few guidelines that we ask you to follow:

1) The *Alumni Bulletin* is published six times a year. The dates of publication and copy deadlines are:

Jan./Feb.	**Dec. 1**
Mar./Apr.	**Feb. 1**
May/June	**Apr. 1**
July/Aug.	**June 1**
Sept./Oct.	**Aug. 1**
Nov./Dec.	**Oct. 1**

2) Per word (single insertion) 10 word minimum ..... 50¢
Per word 2 times in one contract year ..... 45¢
Per word 6 times in one contract year ..... 40¢
3) Payment for all insertions must be received with the copy.
4) Post Office box number counts as two words. Telephone numbers count as one word. No charge for Zip Code. We are unable to accept HMAB box numbers.
5) Send orders to: Harvard Medical Alumni Bulletin, 25 Shattuck Street, Boston, Massachusetts 02115.

For March/April this is what the **Bulletin Bazaar** offers:

SITUATIONS WANTED

Let's Get Together. You want experience, reliability, judgment, organization, attention to detail, personality, sense of humor, excellent typing, editorial skills, and references. I want a challenging job. Call 7-9 P.M. (617) 868-6742.

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Cape Cod. Fine waterfront property. Large summer house with lovely views from two screened porches. Working fireplaces in living room, dining room, master bedroom. Two car garage with workshop. Boathouse, own dock and mooring. Two and one-quarter acres can be divided. Lilacs, daffodils, lily-of-the-valley. One hour from Boston, fifteen minutes from Woods Hole. Call owner: (617) 732-1518 days, (617) 354-7469 evenings.

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Overview

Depressed? It may not be all in your head

Sarah Wolfe,* a woman in her sixties, was brought to the Beth Israel Hospital in a state of almost lifeless torpor. Her features were devoid of expression; she only nodded dully to questions. In all appearances, it was a classic case of senile depression, for which little could be done. Then members of the hospital's behavioral neurology unit examined her and diagnosed a brain tumor. After surgery to remove it, Mrs. Wolfe emerged with her normal vitality and personality restored.

Cases like this are the reason that the new behavioral neurology unit was established. According to its director, Beth Israel neurologist in chief Dr. Norman Geschwind '51, many behavioral disorders that are customarily diagnosed as strictly psychological, are in fact due to treatable physiological causes. The facility specializes in the diagnosis and treatment of conditions such as senility, stroke, pseudodementia resulting from depression, dementia due to tumors, and specific language and habit disorders having neurological causes. "Behavioral neurology, or the study of physiological reasons for changes in behavior resulting from alteration in the brain, is the most neglected area of medical science today," asserts Dr. Geschwind, who is also James Jackson Putman Professor of Neurology at HMS. "While many disorders of behavior are, of course, psychologically caused, the role of brain changes in many cases has been largely ignored."

The psychological as well as physical causes of behavioral problems are diagnosed at the four-month-old behavioral neurology unit. Staffed by six neurologists, a psychiatrist, two psychologists and a speech therapist, this is one of the few centers of its kind ever established.

* *Not her real name*

Dr. Geschwind

HMS & HSPH curricula: cross-pollination

The Medical School's department of preventive and social medicine will soon be able to offer students a greater variety of educational experiences, thanks to a decision voted at the February 18th faculty meeting. A "Clinical Division of Preventive and Social Medicine" is being established, to facilitate communication and cooperation among the various academic and clinical departments in the medical area working in this field.

Specifically, the department of preventive and social medicine and the School of Public Health should be able to take better advantage of one another's programs, and also to involve related activities of the Medical School's clinical departments in their curricula. For students interested in preventive and social medicine, this will result in a more systematic approach to consolidating information about relevant courses offered by the public health faculty, such as epidemiology, biostatistics and social medicine; and, in community medicine, about possibilities for working with faculty in clinics for the treatment of hypertension, chronic bronchitis and similar public health problems. New, jointly sponsored programs, both in the classroom and in the clinic, may also develop.

At the meeting, the faculty voted to approve and implement the "Proposal for the Organization of a Clinical Division of Preventive and Social Medicine" —earlier approved in principle by the faculty council — put forward by a committee chaired by Julius Richmond, M.D., professor and head of the department of preventive and social medicine in the faculty of medicine. The committee had been directed by President Derek C. Bok, Medical School Dean Robert H. Ebert, and Dean Howard H. Hiatt of the School of Public Health, to study ways

of augmenting the program of the department, and of bringing the academic disciplines into closer relation to the clinical.

Under the proposal, the curriculum in preventive and social medicine will still be primarily the responsibility of that department at the Medical School. The new division will be headed by the department's chairman, with an assistant head from the faculty of public health. One question on which the faculty has so far deferred consideration is that of joint appointments.

Digging it

The pursuit of paleopathology — the study of bone disease in ancient human populations — is the way Ted Steinbock '77 has found to bring together his two main academic interests, medicine and archeology. A scholarly and readable new book, *Paleopathological Diagnosis and Interpretation,* which should intrigue physicians, archeologists and anthropologists alike, is the 440-page product of a fascination that began in childhood.

Peruvian mummies, Eskimo skeletons, New Mexican Pueblo Indians, leprosy victims from medieval Denmark, Egyptian bone material, and five-millenia-old remains of an Indian tribe discovered in Kentucky are among the cast of characters featured in the volume — many of them depicted in the 274 illustrations and photographs taken by Mr. Steinbock himself. The reader is led from an introductory chapter about the biology and gross anatomy of normal bone, through descriptions of the major traumatic, infectious, nutritional, metabolic, degenerative, and neoplastic diseases of the bone that affected these ancient populations. Differential diagnoses are explored, and epidemiological data are provided for each disease.

Mr. Steinbock grew up amid the corn and tobacco fields of Kentucky, where fossils and arrowheads were still to be found by a perspicacious and sharp-eyed little boy. He went on to participate in several "digs" out west, and by the time he was a junior at Harvard College, was resourceful enough to squeeze a course in paleopathology at the Smithsonian Institute into his busy program. While at college, he made the acquaintance of the antediluvian inhabitants of the bone collections of the Peabody Museum, the Smithsonian, the Army Medical Museum, and HMS's own Warren Museum, as well as the museum in his home city of Louisville. The present book is an expanded and revised version of his senior honors thesis, written under the guidance of Professor Farish Jenkins of the biology department.

The author's future plans would not necessarily be divined from all this — he is looking forward to training in medicine and radiology at the Massachusetts General Hospital.

The skull of an Alaskan Eskimo with extensive bone lesions caused by tertiary syphilis. From Paleopathological Diagnosis and Interpretation.

Moseley Fellow Cohen '69 will study in Sweden

Benjamin E. Cohen '69, a plastic surgeon, has been chosen winner of this year's Moseley Travelling Fellowship. Beginning July 1, Sweden will be the site of his fellowship year, during which he plans to carry on research with Dr. Tord Skoog in the department of plastic surgery at the University of Uppsala, on the topic of "Controlled Generation of Cartilage and Bone."

Currently chief resident in plastic and reconstructive surgery at the Massachusetts General Hospital, Dr. Cohen has spent an intensive six years training there first in general and then in plastic and reconstructive surgery. Working in the Microsurgical Laboratory, he learned techniques for joining blood vessels smaller than one millimeter in diameter, and participated in several pioneering reconstructive operations. Besides microvascular surgery, his main clinical interests are in the repair of congenital facial defects, hand surgery, and reconstruction of facial defects caused by trauma or by extirpative procedures for cancers of the head and neck.

Dr. Cohen's research background includes two years in the Public Health Service, working in basic cellular immunology with Dr. William E. Paul at the NIH Laboratory of Immunology. In 1969, before his graduation from HMS, a scholarship arranged by the Children's Hospital Medical Center enabled Dr. Cohen to spend six months in Sir Peter Medawar's immunology laboratory at the National Institute for Medical Research in Mill Hill, England. During medical school he worked part time and in the summers with Judah Folkman '57 at the Sears Surgical Laboratories of Boston City Hospital, in areas of cancer research and organ perfusion and preservation. To date, his research efforts have led to co-authorship of nineteen articles.

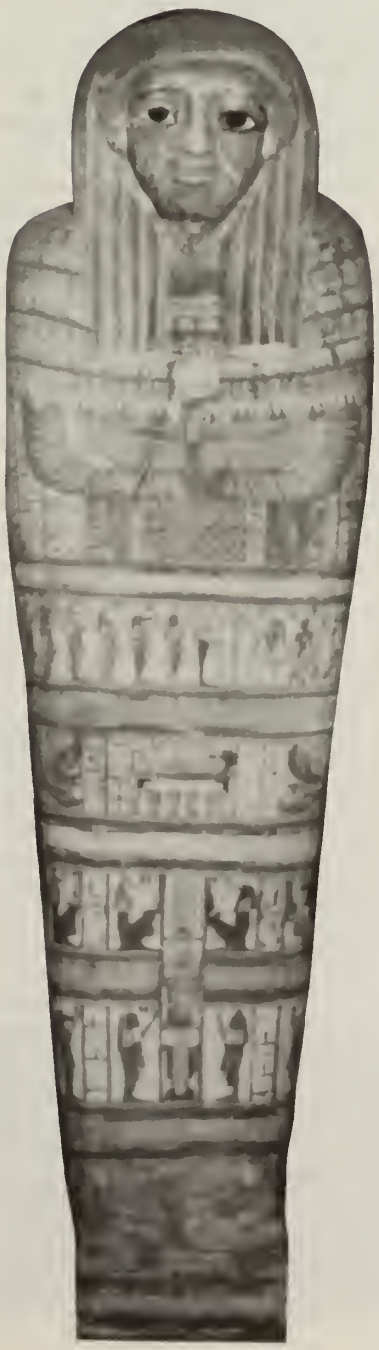
The case of the Ether Dome mummy

by George E. Gifford, Jr.

Acknowledgment and dedication

In 1974 Irving Beck '36 gave me two items from his library: the New York broadside, *The Egyptian Mummy*, and a reprint of John C. Warren's article from the *Boston Journal of Philosophy and the Arts*. This was the impetus for further investigation on the mummy. The gracious cooperation and expert photographs of Stan Bennett of the photography laboratory of the MGH are much appreciated. My friend Ruth Tinkham checked sources for me at several libraries with care and devotion. The cooperation of Dr. Jack Dreyfuss has made the writing of this article a pleasure — his enthusiasm, skill and articulateness are a delight. This article is dedicated to Irving Beck who started it all.

George E. Gifford, Jr., M.D., who steered the Alumni Bulletin *through the Bicentennial as its guest editor for two consecutive years, resumes the* leitmotif *of his former contributions to the HMAB: writing about the physicians who dabbled in natural history and medical exotica. In this article, he traces the enigma of the Ether Dome mummy, and how a medical artifact has been approached through various epochs, from nineteenth century dissection to the x-ray technology of the twentieth century.*



The handsome and talented young surgeon carefully cut away the bandages from around the face and exposed the sunken eye sockets. His own steely blue eyes looked at those orbits which once could have seen Homer or the building of the pyramids in Thebes before the time of Christ. Unwrapping further, he saw the carefully placed beetle, the symbol of immortality, on the hawklike nose of this Egyptian, and breathed in the strangely different odors of natron and bitumen asphaltos. He noted the incisor teeth to see if they were sharp or canine. He contemplated the smells that had passed through those nares —the seamy odor of the Nile, the incense of the temple, and even the aroma of fresh baked bread. This man of ancient Egypt believed that his soul did not quit his body at death; if it remained uncorrupted after three thousand years, the soul was allowed to pass to another living body.

As the doctor proceeded with his examination, he realized that he was violating the stillness of centuries. Twenty-three years later the mummy would be present when this same surgeon performed an operation using a liquid, the vapors of which, when inhaled, would cause sleep — a process that would lend immortality to both the room and the surgeon. Over a century later the mummy would be subjected to as yet undiscovered rays that could pass through the black leather-like tissues to reveal information about his bones, enabling doctors to learn the secrets of his two thousand-year-old aches and pains. Yet his fixed stare still focuses on the room where he was violated so long ago.[1-6]

Who took the knife to this enshrined body? Dr. John Collins Warren, who at the Massachusetts General Hospital in 1823, dissected the first Egyptian mummy sent to the United States. In the words of Dr. Warren:

This mummy was sent to Boston by Mr. Van Lennep, merchant of Smyrna, to be given to some public establishment as a mark of respect to the city. This gentleman had requested Mr. Lee, British Consul in Alexandria, to procure a mummy; and the latter, "having found" as he says in his letter, "that no good ones, opened, were to be found in this place or Cairo,

"The skin of the face being exposed, was dry, hard, of a black colour, and its texture readily distinguishable, although deeply imbued with the embalming bitumen."

commissioned a person going to Thebes to select one, and he succeeded in procuring the best that had been seen for a long time." On its arrival in Boston it was placed in the charge of Bryant P. Tilden, Esq., and Captain R. B. Edes, who thought they should best accomplish the intentions of Mr. Van Lennep, by presenting it to the Massachusetts General Hospital, in order to aid the funds of this charitable institution. They requested my colleagues Doctors Jackson and Gorham with myself, to open the cases, and examine their contents; and afterwards the trustees of the Hospital, having received the donation, desired me to give a description of it for the satisfaction of the public. The freshness and fine state of preservation of every part, led some persons to suggest that it might be one of those fabricated mummies, of which we have heard. These suspicions induced me to examine every thing belonging to it with great care, that I might be able if it proved genuine, to do justice to the gentleman who presented it, and to afford the Hospital the fair benefit of its exhibition. The results of this investigation, together with the drawings made for the outer case, I now beg leave to send you, for publication in your Journal, if you find them likely to be in any way useful.[1]

Why did the Dutch merchant, Jacob Van Lennep of Smyma and Consul General of The Netherlands, have "respect for Boston?" Why did he choose to bestow the mummy upon the Massachusetts General Hospital? Jacob's brother was most likely the Rev. Henry J. Van Lennep (1815-1889), a missionary under the patronage of the American Board in Turkey, who wrote about his travels to Asia Minor.[7] Mary Elizabeth Hawes, the only daughter of Rev. Jack Hawes, of Hartford, Connecticut, married Henry Van Lennep and sailed with him for Smyrna. In her *Memoir,* M. E. Van Lennep does not specifically name her brother-in-law Jacob, however quite probably she persuaded him to send the mummy to "The Hub."[8]

Who were Mr. Van Lennep's agents — Bryan P. Tilden, Esq. and Captain Robert B. Edes? In the Boston Directory of 1822 there is listed, "Bryant P. Tilden, Merchandise Broker, Counting Room, 14 State House Otis Place."[9] For the elusive Captain Edes a one sentence summary reads: "Edes, Robert (Capt.) born 3/11/1789.M. and removed to Boston."[10] As the Massachusetts General Hospital was chosen the repository for the mummy, the appreciative Hospital trustees felt it appropriate to honor Tilden and Edes; at the annual meeting on May 1, 1825, they, as well as Jacob Van Lennep of Smyrna, Rufus Wyman, and Samuel Sewett, Esq. were elected members of the Corporation.[11]

When the mummy came to Boston on May 4, 1823 things Egyptian were of great interest in America. Napoleon Bonaparte had landed at Alexandria July 1, 1798 and spent a year in Egypt, although the *Encyclopedia Britannica* summarily dismisses this much-touted venture: "Of the great expedition nothing has endured but famous sayings, such as 'Soldiers, from these pyramids forty centuries look down on you;' the Institute of Egyptology; the diffusion of the French language in the valley of the Nile; and in Bonaparte's own case, a romantic touch of orientalism, symbolized by his faithful Mameluke, Roustan."[12] In 1799, Boussard, a French officer, found the Rosetta stone — a basalt stile upon which is inscribed in hieroglyphic, demotic and Greek a decree of the priests assembled at Memphis in favor of Ptolemy V. Epiphrates. The stone supplied Champollion with the key to deciphering the ancient monuments of Egypt, was ceded to the British at the capitulation of Alexandria in 1801 and is now in the British Museum.[13]

Around 1803 the first Egyptian mummies were placed in the British Museum, yet as early as 1737 Mr. Alexander Gordon published an essay on three Egyptian mummies, one of which was brought to England in 1722 by Captain William Leetveulier. The French, too, fell captive to the study of the ancient mummies. "M. Rouger, one of the *savants* who were in Egypt with Bonaparte made an exact examination of a great number of mummies, with a view of ascertaining the nature of the embalming substances. He informs us that near the ruins of Thebes, and in the neighboring mountains, he found a great many mummies entire and well preserved. 'It would be impossible,' says he, 'for me to estimate the prodigious number of those which I have found heaped up, or scattered in the sepulchral chambers, and in the multitude of cavities in the interior of this mountain.' "[14]

The year before Warren published his account of the "Egyptian Mummy" in the *Boston Journal of Philosophy and Art,* the same journal carried an article describing the necropolis of Thebes. Warren himself referred to another extant mummy in the environs of Boston. "A mummy at Roxbury, in the vicinity of Boston, belonging to Ward Nicholas Boylston, Esq. has a fine conformation of head. This was purchased by the professor in Egypt and sent to England, where being opened at the custom house, it was so much exposed as to in-

jure the covering, and the flesh has in great measure decayed from the bones. The forehead is elevated and larger, the jaws filled with fine teeth, not prominent, and the head altogether of the European or Caucasian form."[15]

With the novelty and interest in Egyptian mummies, it was only natural that the Boston mummy be exhibited in other American cities. On October 7, 1823 the committee reported that they had *leased* the mummy for a one year tour of other major cities.[16] The profits from the exhibition amounted to fifteen hundred dollars, out of which two hundred dollars was given to the Boston Dispensary.[17] Most fortunately, one of the broadsides advertising the exhibition in New York has been preserved.[18] The front cover is clearly reproduced from the illustrations in Warren's article. The second page contains an ornately printed title, "The Egyptian Mummy," and, underneath, the inscription, "There is nothing upon which the living eyes can rest more impressive and interesting than the preserved mortal remains of human beings who were inhabitants of this earth more than 3000 years ago. Such are the *Egyptian Mummies,* embalmed, bandaged, encased, and preserved in excavated recesses of everlasting rock.

"Several of these Mummies are deposited in the British and French Museums, and other celebrated Cabinets in Europe, which some among us have seen. This Specimen, one which was taken from a recently discovered Catacombs at Thebes, is in the finest state of preservation and is the only one ever brought to America."

The broadside concludes with a poem, "Address to the Mummy At Belzoni's Exhibition By Campbell." One stanza will suffice to give the flavor of the piece:

And thou hast walked about, (how strange a story!)
In Thebes's streets three thousand years ago,
When the Memnonium was in all its glory,
And time had not begun to overthrow
Those temples, palaces, and piles stupendous,
Of which the very ruins are tremendous.

At the end of its tour, the mummy returned to the Massachusetts General Hospital, residing there until 1879, when it was deposited in the Art Museum of Boston (now the Museum of Fine Arts) "for safekeeping." An historian of the hospital wrote, "His [Warren's] careful examination led him to believe that it was the body of an Egyptian priest, who probably lived before the days of the Persian conquest. These priests were also the physicians of their time, so perhaps his final location in a hospital has not been altogether distasteful to his possible hovering spirit. However, in the Art Museum he might have encountered an old contemporary."[19] Since 1900 it has remained steadfast in the Ether Dome, hence acquiring its sobriquet of the Ether Dome mummy.

Dr. Warren's postmortem of the mummy is a model of accurate description: . . . . *The mummy presented by Mr. Van Lennep to the Massachusetts General Hospital was enclosed in a large deal box. On opening this, the outer coffin or sarcophagus appeared as represented in the plate. It is a wooden box, seven feet long, and of a breadth proportional to the length, like the proportion of the human body.*

The upper part of it is curved, in a very striking and peculiar style, to represent a human head; and, as it appears from the authors who have described the customs of the Egyptians, it was intended to be a likeness of the deceased person. The head is covered with a striped cloth or turban, on the upper part of which is painted a globe.

The front cover of the New York broadside. The figure of the mummy is taken from the Warren illustration.

According to Egyptian mythology, a being was composed of two elements, the spiritual or "ba" and the corporeal or "ka." A representation of the winged ba of Paddy Hershef is among the ornamental hieroglyphics on the sarcophagus.

The face has the character which has generally been considered as belonging to the Egyptians. The skin is of a reddish color, the eyes black, nose broad, but not badly proportioned, mouth well formed. The face is broad and short; it has a very agreeable expression, approaching a smile.
The shoulders are invested with a highly ornamental mantle, on the fore part of which the turban is seen depending. Below the mantle, in the middle, is seen the winged globe, by some considered as the sign of eternity: by others . . . . the oldest representation of divine powers . . . . and it may therefore be believed to be significant of the immortality of the soul of the deceased, or else to be the symbol of divine protection.

In the second compartment or tablet, below the globe, we have the representation of a most singular group, exhibiting the last judgment of the deceased and his reception by various divinities . . . we notice four personages on the left, who are looking to the right and the persons on the right looking to the left. Behind the last of these, on the extreme right, is seen the balance, in the form of a cross, with a Cereberus as the evil genius sitting on its left and a hieroglyphic representation of the friendly divinity on the right. The figure next [to] the balance without any other garment than a kirtle, is supposed to be that of the deceased, coming from judgment, under the protection of a divinity who had hold of his hand and seems to have taken him under his protection, in order to present him to the assembly of deities. At the head of these is the serpent, supposed by some to have been regarded as the good angel by the Egyptians. Next follows the great Osiris, the principal deity of the Egyptians, designated by his mitre, and staff or sceptre, the emblem of power; he has the attitude of receiving the newcomer presented to him. After Osiris are seen four, or on the inner case five, other personages, bearing the heads of a dog, a baboon, a hawk, a wolf respectively, supposed to be representations of important divinities . . . .

. . . . This mummy is about five feet long, heavy, and solid to the touch. A single cloth of yellowish colour enveloped the whole body from head to foot, being confined closely and neatly to the body by a number of transverse bands of a white colour, under which lay the reliques of corresponding dark coloured bands, as much decayed as to crumble to atoms on being touched. The dark bands were broader than the white, so as to exhibit their edges and produce an ornamental effect; but the colouring substances had caused them to decay, while the others remained entire.

At the feet lay a large heap of beads, composed of green and yellow porcelain, partly connected by threads, whose decay had caused the network to fall in pieces. A green network like this is seen covering the bodies of Osiris . . . and the winged Isis on the inner case; and there is no doubt it was intended to invest the whole of the body for some religious purpose. As the beads could not be shown in this disconnected state, they have been put together and placed on the mummy, though not in the original form, but as well as circumstances permitted. Some of the beads are still very firm, others crumble on slight pressure.

In order to examine the state of the body, I cut through the external cloth, where it covered the head, and found a great many turns of bandages about three inches wide, rolled around, to the number of twenty-five thicknesses. The outer cloth and the outer turns of bandages were in fine preservation and of considerable strength. They exhibited marks of having been imbued with some glutinous substances, intended to preserve them; and to which is to be attributed the yellow colour. The inner turns were more decayed as they were nearer to the body; those next to it were quite rotten, and so closely cemented to the surface as to be separated only by a laborious process. The cementing substance is asphaltos, the same in which the body is embalmed. This substance was quite dry, hard, and brittle. Imbedded in it, on the nose, was found a beetle, and near this another small insect, whose character could not be determined. The beetle was a sacred animal, in high estimation among the Egyptians . . . and has been supposed to be the symbol of fecundity.

The skin of the face being exposed, was dry, hard, of a black colour, and its texture readily distinguishable, although deeply imbued with the embalming bitumen. It was wrinkled as if it had been exposed to the action of great heat, or pressure while in a softened yielding state; and the latter cause had produced a distortion of the features, from the right to the left side. The sockets of the eyes are filled up, the eyelids preserved; but the eyebrow, together with the other hair, is removed or destroyed near to the head, probably by the action of heat; just enough of it remaining however to show that it was not black nor crisped or woolly, but of a brown or reddish brown colour. The teeth are perfect, so far as they can be seen; quite white, and shaped like those of the European, contrary to the opinion of some learned men that the Egyptians had the incisor teeth pointed like the canine or dog teeth.

The ears are small and well filled with embalming substance. The skin of the scalp has the same appearance as that of the face. Being unwilling to disturb the coverings of the cloth and bandages, I left everything on the body in the same state as it issued from the sepulchre of Thebes. The bandages about the neck were afterwards cemeted together, to prevent the air from entering, and the head of the mummy was invested with cloth formed into something like those represented on the heads of the cases, instead of the turns of bandages which had originally enveloped it.

Every part examined was deeply impregnated with the embalming substance which proved on examination to be asphaltos, the bitumen of Judea. *(Asphaltos is a black, inflammable, bituminous substance, like pitch; chiefly found floating on the surface of the Red Sea, or Lacus Asphaltites, in Judea, on the spot where stood anciently the cities of Sodom and Gomorrah.)"*[1]

All was quiet with the mummy until 1931 when Dr. Edward D. Churchill '20, later the John Homans Professor of Surgery at the MGH, had the mummy x-rayed for his own curiosity. Those were among the earliest x-rays of any mummy. "Almost immediately after Roentgen discovered x-rays, the value of radiography was recognized by Petrie who published ex-

The two illustrations from the article by John Collins Warren – the external and internal views of the coffin of the Egyptian mummy.

cellent radiographs of the legs and the feet of some of his mummies. One of these . . . shows well-defined lines of arrested growth in the lower end of a tibia. It is extraordinary, however, that Petrie made no mention of this radiograph in his text. In 1931, Moodie briefly described his radiographic findings in seventeen ancient Egyptian mummies."[20-22] The whole matter has recently been reviewed in *X-Raying the Pharaohs*.[23]

By this time, the Egyptian influence had become apparent in American architecture. In 1832 at the Mount Auburn Cemetery, Jacob Bigelow designed a wooden gate, which in 1842 was replaced by stone. "The gate is in Egyptian style, its height being twenty-five feet and the whole length including the lodge, sixty feet. The piers or posts are four feet square, the entrances ten feet wide, and the greatest length of the cornices twenty-four feet. Two obelisks are connected with the two lodges by a curved iron fence. The outline of the gate is mostly taken from some of the best examples in Denderal and Karnac, in which the piers are vertical and the curves of the cornice vertical in the lower half. The banded cylinder, the foliage of the cornice, and the winged globe are Egyptian. On the latter a lotus flower is turned over so as to conceal the head of the fabulous animal with which the ancient examples are usually defaced. The size of the stones, and the solidarity of the structure, entitle it to a stability of a thousand years."[24]

A distinguished art historian, Talbot Hamlin has written of the period, "Archeological discovery was proceeding apace and the wonders of Egypt were beginning to make an impression on the popular mind. Hence there arise scattered attempts to revive Egyptian forms, of which the most interesting was probably the old 'Tombs' court and prison in New York City. It had dignity, scale, and impressive rise; but the Egyptian forms were too foreign to American psychology, demanded too expensive material and decoration, and were too little understood to gain wide adoption."[25] In 1880, Cleopatra's needle was set up in Central Park. The obelisk, one of a pair, was originally erected by Thotmes or Tethmosis III at Heliopolis about 1500 B.C.; they were removed by Caesar Augustus to adorn the Caesareum at Alexandria about 14 B.C. and there remained until the pair were removed —one to London in 1878 and the other to New York. With much difficulty the 200-ton rose-red granite monolith was unloaded at Staten Island where it was towed on pontoons up the Hudson River to 96th Street and then, in a huge crate, rolled on cannon balls to the "worst place within the city getting an obelisk to."[26] Perhaps the apex of the Egyptian influence in America was the inauguration of the 555-foot Washington Monument on February 21, 1885.

In 1960, another MGH staff member began to pursue the mystery of the mummy. Miss Helen Sherwin, coordinator of science instruction and psychiatric nursing for the School of Nursing, requested Dows Dunham, Curator Emeritus of the Department of Egyptian Art at the Museum of Fine Arts, to examine the mummy case. Dunham determined by the style of decoration and type of name on the sarcophagus that the mummy was most likely from the 26th Dynasty (663-525 B.C.) or somewhat later, and he translated the hieroglyphics on the inner case: "Spoken by Osiris. He gives all food-offerings for Paddy Hershef, deceased, son of Iref-a-en-her; his mother, the Lady Heribes-enes, deceased. Greetings to The Osiris (foremost) of the West, great god in the midst of_____." Dunham also stated that the name means "gift of the god Hershef" and that "Her-ibes-enes" means loosely, "She is satisfied with her" but unfortunately, "we cannot tell what sort of man this was; nor what his occupation was."[27] Any Egyptologist who gives the name "Paddy" to a mummy in Boston is perhaps open to the accusation of parochialism.

When I became intrigued by the mummy and its history, I inquired at the MGH Archives to see if the Churchill x-rays were still intact; they were. Missing, however, was a skull x-ray. By happenstance, I found that yet another person was working with the mummy x-rays — the MGH tradition of mummy watching is certainly auspicious! My colleague turned out to be Dr. Jack Dreyfuss, associate clinical professor of radiology at MGH. I discussed with him the fact that there was no skull x-ray in the Churchill series. To my delight, Dr. Dreyfuss agreed to "give a reading" of the Churchill x-rays and to x-ray the skull. His report follows:

RADIOLOGICAL CONSULTATION

NAME: Paddy Hershef
(The MGH Mummy from Thebes)

UNIT NO.: (MGH) 207-51-34

CURRENT RESIDENCE: The Ether Dome, Bulfinch Building
Massachusetts General Hospital, Boston

X-ray films dated 6-16-31 have just been located and submitted for interpretation. The body appears to be that of a male who was in his late forties when he died about 2,500 years ago.

A general comment must first be made about the soft tissues of the mummy. As seen on all of the x-ray films, the shriveled skin appears to be coated with a substance of thin radio-density that contains scattered, gravel-like particles. This is most likely the residue of the salting or embalming material, natron, a mixture of sodium carbonate, sodium bicarbonate and such impurities as iron, calcium, and silicon salts. Also contributing to the density on the skin may be another substance--bitumen, a form of pitch or asphalt (also known in antiquity as asphaltos or the bitumen of Judea), which was often used as the final embalming or preservative coating on mummies of this period. It seems probable that the bitumen may, in addition, account for the black coloration of the skin which was first noticed when Dr. John Collins Warren unwrapped the head in the early 1820s and which is still obvious today.

The radiographic examination is comprised of the following studies:

CHEST:

This and the subsequent five x-rays seem to have been made while Mr. Hershef was temporarily removed from his decorated wooden mummy case. The numerous bandage windings around the upper body are clearly seen, as are the underlying shrunken and desiccated soft tissues of the arms and chest wall.

The thorax is symmetrically compressed by the tight bandaging. The thoracic viscera were apparently removed and not returned to the body cavity in the visceral packs commonly used prior to the 26th Dynasty (664-525 B.C.). They were probably placed in canopic jars instead.

The most startling finding is the absence, at least on this one film, of many of Mr. Hershef's cervical vertebrae. Further study is clearly indicated! Cloth wrappings and bits of the remaining beaded net that once must have covered the entire mummy can be seen on the x-ray draped about the distal stump of the neck and over the left shoulder. There are no evident metallic amulets within the bandages or on the surface of the thorax.

AP Chest Film of the Mummy.
The thorax is compressed by the tightly wound wrappings, and the overall speckled appearance is thought to be due to embalming substances on the skin surface. The shriveled soft tissues of the arms and chest wall can be seen. But look--only the lower stump of a neck is present!

AP DORSAL SPINE:

In addition to the findings already described in the chest film report, there is evidence of a mild right-convex upper dorsal and left-convex lower dorsal scoliosis. The ribs and thoracic vertebrae show good mineral content, and there are no fractures.

Again, something is missing. There are 12 ribs on the right, but the 11th and 12th ribs on the left cannot be detected. Evisceration was usually carried out through a flank incision and removal of ribs was not a part of this procedure. A congenital anomaly is possible, although the appearance of the dorsal vertebrae does not support this. So, another mystery rendered insoluble by the passage of twenty-five centuries.

LATERAL LUMBAR SPINE:

The vertebrae are well mineralized without collapse. There is, however, some degenerative narrowing of the intervertebral spaces between L2-3, 3-4, 4-5, and L5-S1. Mild degenerative spurring is noted about the vertebral margins of L3 and 4. The lumbar curve is flattened, probably a post-mortem change secondary to the mummification and tight bandaging procedures that were used.

AP PELVIS AND THIGHS: (two films)

There is mild osteitis pubis and there is narrowing of each hip joint space, which appears to be based on true degenerative disease and not due to post-mortem change. The femora and knee joints look remarkably good--except for narrowing of the medial joint compartment of each knee. In addition, there is calcification of the lateral meniscus of the right knee, a degenerative change.

Mr. Hershef's arms are extended on his abdomen with the hands side by side just below the pubis, in the classic Egyptian burial position. The interphalangeal joints of the hands are intact and slightly flexed.

The desiccated skin of the arms, trunk and legs is clearly seen. And what looks very much like the shriveled, coated remnants of male genitalia are noted below the pubic symphysis.

In the wrappings are a common pin and a carpet tack of recent origin, presumably applied to keep the bandages tight and neat.

LOWER LEGS:

More than any of the others, this film records the exquisite meshwork of the linen bandages that envelop the mummy. In thickness, the multiple wrappings measure from 3.5 to 5.5 cm. lateral to the shrunken soft tissues of the fibulae. The trabecular and cortical detail of the bones is as sharp and dense as that of a living man.

AP Pelvis and Proximal Femora.
Mr. Hershef's hands are side by side below the pubis. The hip joint spaces are narrowed. The carpet tack and pin are latter day additions to hold some of the frayed wrappings in place.

AP Lower Femora and Knees.
The interphalangeal joints of the hands are flexed. There is calcification in the region of the lateral meniscus of the right knee. The dessicated soft tissues of the thighs are coated with embalming substances.

Finally, there are several "growth arrest lines" in each distal tibia, indicative of brief periods of renewed bone growth following transient periods of inhibited growth. These lines of increased density are the silent, timeless hallmarks of episodes of childhood or adolescent illness suffered by Mr. Hershef.

ADDENDUM:

Because of the apparent absence of many cervical vertebrae, as judged by the chest film, and because no x-rays of the skull or neck nor a lateral film of the dorsal spine were found in the 1931 study, it was decided to radiograph these parts.

On the morning of June 7, 1976, the Ether Dome was reserved for one hour, and a focal-spot portable x-ray machine was wheeled up to the glass case surrounding the mummy. Without opening the case, or even touching it, a magnification technique was used to make these x-rays. This was done by positioning the x-ray film cassette and tube on opposite sides of the glass case, thirty inches apart. With the mummy in the exact center of this gap, the following additional films were obtained.

AP AND LATERAL DORSAL SPINE:

These new views reveal some degenerative changes involving the anterior superior and inferior lips of the mid and low dorsal vertebral bodies. There is slight anterior wedging of D-11. There are no congenital anomalies to explain the apparent absence of the left 11th and 12th ribs.

AP AND LATERAL SKULL AND CERVICAL SPINE:

The calvarium is everywhere intact and shows no sign of disease. It would appear that the brain was removed by a transnasal approach through the ethmoid sinuses. The frontal sinuses are underdeveloped and the maxillary sinuses are clear. The mandible is displaced slightly to the left, as it is when viewing the mummy in its case, most likely due to distortion caused by tight bandaging from right to left.

Although his teeth are for the most part in remarkably good condition, Mr. Hershef did have some dental problems in his left mandible. The left lower first molar is loose in its socket and the second molar is missing. The third molar is present, but there is considerable surrounding alveolar resorption secondary to periodontitis. The upper third molars are also missing.

And now the major mystery: when viewing the mummy in his case, the head appears to be a proper distance above the shoulders. But on x-ray examination, the 1st through 4th and most of the 5th cervical vertebrae are missing! What fills the gap and supports the head? It would seem to be a combination of cloth and possibly wood, all surrounded by remnants of the original bandages and a cloth scarf of more modern vintage, secured by a simple string.

Lower Legs.
The delicate meshwork of the many bandage wrappings on the mummy is shown. A dense coating of embalming material allows the shrunken soft tissues about the mid right fibula to be seen with clarity (just above and to the right of the metal 1931 film marker). Several growth arrest lines are present in each distal tibia. The total diameter of the leg wrappings is 23 cm. The small, dense objects between the tibiae are unidentified.

Lateral Skull.
The vertical densities on the right (over the posterior temporal, parietal, and occipital regions) are the two sides of the back half of the woooden mummy case. (This film was "shot" through both the glass and wooden mummy cases.) The dense objects superimposed on the high anterior parietal areas are actually on the wooden case. Notice the loos lower left first molar, the absent second molar, and the shriveled skir under the occiput. And--Mr. Hershef upper cervical spine is missing!

Since Mr. Hershef's head is obviously in place when viewed in his Ether Dome mummy case, one must conclude that it can be lifted off at will, like a bottle-top. Was decapitation the ugly event that precipitated mummification, or was there some carelessness in the embalming technique? Was Mr. Hershef found to be too long for his intended eternal box, or could it have been that when Dr. John Collins Warren first removed the head wrappings, he dislodged the head? Perhaps an unrecorded accident occurred at the time the original x-rays were taken, or when another set of x-rays was made about ten years ago, which has, by the way, disappeared. But, where are the missing cervical vertebrae?

The mystery of the removable head remains unresolved. Uneasy lies the head with no neck upon which to rest.

Jack R. Dreyfuss, M.D.
Radiologist, Massachusetts General Hospital, Boston
and Associate Clinical Professor of Radiology,
Harvard Medical School

Dr. Jack R. Dreyfuss (left) and radiologic technician Anthony Zingarelli set up their equipment prior to x-raying the lateral skull of the mummy in the Ether Dome on June 7, 1976. Ted Steinbock '77, author of the recently published, Paleopathological Diagnosis and Interpretation *consulted with Dr. Dreyfuss in the interpretation of the mummy's x-rays, being particularly interested in the growth lines of Paddy Hershef.*

Since Paddy Hershef arrived at the Massachusetts General Hospital, he has had the expert solicitude of several Harvard notables — John Collins Warren, Edward D. Churchill, and at present, investigators Jack Dreyfuss and Ted Steinbock. Hershef was silently present at the ether operation on October 16, 1846 and at the Harvard Tercentennial appearance of Gustav Jung. He has been used as a fund raiser. He has stood quietly through countless Medical Grand Rounds and CPC's. This man of Thebes, who may already have reached his 2600th birthday, may have dreamed of immortality with Osiris — but could never have imagined that he would gain immortality as one of the first mummies in America and by the medical ministrations he would later receive at the MGH. Paddy Hershef still holds on to his mysteries inside his wooden case in the Ether Dome — what functions did he have in ancient Egypt that allowed such fine and timeless preservation of his mortal remains, and where along the troubled path of his soul from Thebes to Boston did parts of his neck take leave of those remains? Perhaps his winged "ba" or migrating soul yearns for Egypt like the swallow in Oscar Wilde's fairy tale, *The Happy Prince*:[28]

I am waited for in Egypt," said the swallow. "My friends are flying up and down the Nile, and talking to the large lotus-flowers. Soon they will be going to sleep in the tomb of the great King. The King is there himself in his painted coffin. He is wrapped in yellow linen, and embalmed with spices. Round his neck is a chain of pale green jade, and his hands are like withered leaves.
I am waited for in Egypt. Tomorrow my friends will fly up to the Second Cataract. The river-horse couches there among the bulrushes, and on a great granite throne sits the god Memnon. All night long he watches the stars, and when the morning star shines he utters one cry of joy, and then he is silent. At noon the yellow lions come down to the water's edge to drink. They have eyes like green beryls and their roar is louder than the roar of the cataract.

He told him of the red ibises, who stand in long rows on the banks of the Nile, and catch gold fish in their beaks; of the Sphinx, who is as old as the world itself, and lives in the desert, and knows everything; of the merchants,

who walk slowly by the side of their camels, and carry amber beads in their hands. . . .

In Egypt the sun is warm on the green palm-trees, and the crocodiles lie in the mud and look lazily about them. My companions are building a nest in the Temple of Baalbec, and the pink and white doves are watching them, and cooing to each other.

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"Marvellous Instrument, invented by the supreme Master"

— The Notebooks of Leonardo da Vinci

by Don W. Fawcett

It is my pleasure to welcome another class to the study of human anatomy. This is especially gratifying for I know that this subject is somehow much closer to your career objectives than some of the courses you have had heretofore. In your first semester you had some histology, biochemistry, and physiology. All of these are important subjects, basic to medicine, but in many respects they did not differ radically from your premedical courses in college. But human gross anatomy, I am sure, will be an entirely novel educational experience for you. This course is not about cats, or rats, or microorganisms — it deals with an *understanding of human beings.* A concern for human beings is, no doubt, a major factor in your motivation for a career in medicine.

To your generation, which makes much of relevance, this course should have great appeal. You will spend much of your professional life trying to diagnose internal disorders from inspection, palpation and percussion on the exterior of the human body. This course is your first opportunity to see inside and to develop a mental image of the topographical relations of the organs. We hope you will develop and retain in your minds a three dimensional image of the structure of the body, which will be an enduring frame of reference for clinical practice.

As the oldest of the basic medical sciences, anatomy long occupied a disproportionate share of the curriculum. In many European schools the anatomy course is still several hundred hours long and extends over two academic years, with detailed dissections carried out by the students.

With the establishment of the core curriculum here a few years ago, anatomy was shortened to a *five week block.* This was a disastrous experiment. It left so little time for the student to assimilate a large amount of material that it was felt that dissection by students had to be reduced to a token amount, giving them merely a sample of the technique of dissection. We resisted this change — because anatomists feel strongly that the only proper way to learn the subject is from the body, and there is no adequate substitute for a careful, deliberate dissection. However, dissection is time consuming and with the severely limited time alloted this subject in the core curriculum, it was difficult to justify the time required for the students to expose the structures themselves. For the past several years, we were obliged to have the bodies prosected by second year students and departmental staff.

Fortunately the curriculum revision of two years ago improved the situation somewhat. Instead of a five week intensive block, the course now extends throughout most of the second semester. The number of hours is still too few, but this arrangement at least provides more time for assimilation, and once again allows the students to do some dissection.

Let me emphasize here that you will not retain much useful information if you do not take full advantage of the prosected bodies and your own dissections. The place to acquire a useful knowledge of human anatomy is in the laboratory — not simply by memorization from textbooks.

Do not disdain some memorization, however. It has lately become fashionable among students and some educators to revere *concepts* and to consider *facts* and their retention a preoccupation of lesser intellects. There are some principles on which the body is constructed; there are a few valuable concepts — but for the most part in gross anatomy we deal with a large body of facts. Where the appendix is situated *is a fact;* no amount of theorization will substitute for certainty on this point. The topographical relation between the femoral artery and femoral vein *is a fact* and a wrong decision to tie one instead of the other *may cost the patient a leg.* Therefore I hope you will not approach this subject with the elitist attitude that facts and their memorization are beneath you — or with the defeatist attitude that you have no talent for memorization. Neither is true.

It is only in the past century and a half that medical students have had the privilege of learning anatomy directly from the human body. To gain this privilege, it took a long struggle against church, superstition and legal prohibitions. I think you should know something about the history of human dissection.

Don W. Fawcett '42, who is Hersey Professor of Anatomy and James Stillman Professor of Comparative Anatomy, has been teaching anatomy to Harvard Medical students almost continuously since 1946. In 1959 he became chairman of the department, and since 1975 he has been senior associate dean for preclinical affairs. He is a former curator and current member of the museum committee of the Warren Anatomical Museum. For the past six years, Dr. Fawcett has given this introductory lecture to the first year class. After delivering the following historical account, he goes on to introduce the students to the lexicon of anatomical terminology.

With an appropriately austere and intense countenance, John Collins Warren posed for this formal portrait a few years before his death in 1856. Dr. Fawcett (below) remains somewhat in awe of his predecessor. "Such commanding presence! I have postured with a skull before a mirror. I have even grown a beard — but it is no good. I just cannot measure up to the towering dignity of my academic ancestors."

The story begins with Galen — not with Hippocrates. The medicine of Hippocrates was founded only on shrewd observation; it had no scientific base. Galen, born in 130 A.D. in what is now Turkey, was not only a good observer but a dissector and experimentalist as well. He studied anatomy in Alexandria (Egypt), where human bodies were not generally available. But he appears to have undertaken at least one human dissection on the body of a robber he found dead on a lonely mountainside. The baboon was abundant in Egypt and the great majority of his dissections seem to have been on this primate and on various other animal species from which he extrapolated to man. He wrote some nine volumes on human anatomy assuming that the parts were essentially identical to those of the animals he dissected. He returned to Pergamon and at age twenty-eight became "physician to gladiators" — which I imagine was probably the ancient equivalent of being doctor for the New York boxing commission. For several years therefore, he had at least some experience with human anatomy as revealed by trauma. He then moved to Rome where he practiced for about thirty years, continuing his animal dissections and writing prolifically. He was especially interested in muscles and described some two hundred of them. He was the first to realize that the movement observed when a muscle relaxes is often produced by contraction of an opposing muscle, and that each muscle has only one direction of contraction. Although this seems obvious to us now, many of his contemporaries were confused on this point because of the diversity of movements of the tongue. Galen showed that there were muscles in the tongue whose orientation corresponded to each component of its complex movements.

He also carried out an ingenious series of experiments cutting nerves. He transected the spinal cord at various levels in animals and observed the effects. When he cut caudal to the eighth vertebra, he noted that the forelimb was spared paralysis and when the cord was hemisected, paralysis was unilateral. He concluded from his experiments that the "force" causing muscles to contract originated in the brain and was communicated to the muscles by the nerves. Quite remarkable findings for 160 A.D.! He had an extraordinary urge to record and communicate — his writings while in Rome ran to some two and a half million words. His works provided the anatomical basis for the practice of medicine during the next ten centuries. With the passage of time his writings took on such authority that few physicians questioned or undertook to verify his observations. Indeed, when William Harvey wrote his famous treatise on the circulation of the blood in 1628, its point of departure was a discussion of experiments by Galen fourteen hundred years earlier.

Throughout the Middle Ages, religious beliefs were a great obstacle to medical progress. The church of Rome held strong and superstitious objections to human dissection. The study of osteology was prevented by a Papal Bull of Boniface VIII against the boiling of human bones. There were occasional enlightened monarchs who removed these prohibitions. In 1224, Frederick II, Holy Roman Emperor and King of Sicily, decreed that *no one could perform surgery if he had not learned anatomy by dissection.* (In the past ten years, we would have fared better if we had had him on our curriculum committee!)

In the late Middle Ages and early Renaissance an occasional dissection was allowed by the ecclesiastical authorities. The subject for dissection was always a prisoner condemned to death. Special rites of the church were performed over him to compensate his soul for the indignities about to be done to his body. When these rites were completed he was strangled by the executioner and the body turned over to the university. The dissection itself was an elaborate social function, invitations being issued to the local politicians and other persons of prominence. In the presence of the assembled students and other guests, a servant arose and read aloud the Papal indulgence permitting the dissection. The corpse was then stamped with the seal of the university. After a preliminary oration by the physician in charge, the dissection was begun. The presiding physician did not touch the body — in the sixteenth century it was regarded as undignified for a professor to do his own dissection. Instead, the body was crudely opened by a servant, a barber-surgeon, or a hog gelder while the physician sat on a platform and read aloud from the pages

of Galen, indicating from time to time with a long pointer the general location of the various structures as they were enumerated in the text. The dissection was little more than an examination of the easily accessible organs. No effort was made to verify the observations of Galen. These were accepted without question.

A young anatomist of this period deserving of special attention is Marc Antonio Della Torre of Verona, who had the ambition to write an anatomic text more accurate than those of Galen. He enlisted the aid of Leonardo da Vinci. Where or how he obtained his bodies is not clear, but he dissected and Leonardo drew. Unfortunately, Della Torre died at thirty-three and the book never came to fruition. But he had kindled in Leonardo an interest in anatomy and physiology that continued. He made some 750 anatomical sketches in red chalk that were never published and were generally unknown until rediscovered in 1898. They thus had little or no impact upon the study of anatomy.

The greatest contribution to human anatomy was that of Andreas Vesalius, born in Brussels in 1514. He had an insatiable curiosity and the courage to break away from the traditional veneration of Galen. He was an avid dissector — it is said that the body was his Bible and he cared not where he obtained copies. As a medical student in Paris he was a frequent visitor to a cemetery that was a dumping ground for the bodies of criminals. He acquired his first complete skeleton at Louvain by surreptitiously cutting down the body of a criminal who had been executed and hung up in chains for the people to see as a deterrent to crime. Under existing law he might himself have been executed if caught. By careful dissection he turned up at least two hundred errors in the writings of Galen due largely to Galen's dependence upon dissection of apes, dogs and other animals. To illustrate his monumental systematic textbook *De Humani Corporis Fabrica,* Vesalius enlisted the services of an exceptional artist, Stephan van Calcar, a student of Titian. The numerous beautiful woodcuts were strapped to donkeys' backs and carried to a printer in Basel. The publication of this great book in 1543 is generally recognized as the founding of the science of anatomy.

Interest in human dissection was greatly stimulated by Vesalius's work, but a great many years were still to pass before anatomy could be taught to medical students with their participation in dissection. There were no legitimate sources of bodies, and in time grave-robbing was resorted to in order to obtain bodies. This soon developed into a vocation of which the practitioners were popularly known as "resurrectionists." They made a business of supplying medical schools. This practice only served to increase the outrage of the public against dissection and led to measures that made it still more difficult to teach anatomy.

In colonial America opposition was equally strong. The first attempt at anatomical instruction in Boston was undertaken in 1780 by John Warren, a founder of this school, whose brother was killed in the Battle of Bunker Hill. It was necessary to carry out his demonstrations in the greatest privacy because of the popular prejudice against dissection. Some of the leading figures in the dramatic events of this period were my predecessors in the Hersey Professorship, which is the oldest endowed chair of anatomy in America — among them, John Collins Warren and his successor, Thomas Dwight.

In the 1780s, John Warren was professor of anatomy and his son, John Collins Warren was an undergraduate in Harvard College. (I find it hard to imagine that he was ever an undergraduate.) The curriculum was not very taxing. There were no sit-ins, teach-ins, marches on Washington or protests over grading, and when things were dull in Cambridge, John Collins Warren occasionally helped his father by obtaining bodies. He tells of one such occasion in his biographical notes. Having heard one day that a pauper, who had died unclaimed by friends or relatives, was buried in the North Burying Ground, he and a party of his college friends determined to secure him. They arrived after dark and quickly exhumed the body. As they were removing it from the cemetery a man appeared, but one of the party engaged him in an argument and managed to get him down a side street while the body was packed into a carriage and driven off to Cambridge. The rest of the party stayed behind to fill up the grave and got back to Cambridge at daybreak. The story goes

From 1919 to 1949, a redoubtable figure in the lives of first year students was Robert M. Green '06 (1881-1955), teacher of gross anatomy. Classicist as well as physician, Bobby Green taught Greek, translated classical texts, and authored an Arthurian epic. The augustan eloquence of his prose, both in the amphitheatre and in his text for Warren's Handbook of Anatomy, *became legendary. But an equally cherished aspect of his lectures was the admixture of earthy anecdotes, and the force these lent to his explanations is attested to by the vividness with which they have endured in the memories of his former students. The following was included in the 1943* Aesculapiad.

A bearded Swampscott fisherman, who suffered severely with external haemorrhoids, returned to port late one hot summer afternoon from a long, hard day on the thwarts, with his haemorrhoids badly swollen and protuberant. As he limped up the beach, his eye fell on some smooth, round stones, covered with green slime, in a pool left by the receding tides, and it occurred to him that their application to his painful area would be comforting. Selecting a large one, he dropped his trousers, squatted down, and pressed the invitingly cool, slippery stone firmly against the bulging, bleeding haemorrhoids with a sigh of satisfaction. But his relief changed to consternation when the stone slipped through his relaxing sphincter ani and receded from reach.

Dr. Samuel Mixter, a distinguished, resourceful, and sagacious surgeon, founder of the well-known Boston dynasty, was hastily called from his summer home nearby. The stone presented at the anus, like a foetal head at an imperfectly dilated cervix. Use of the obstetric forceps, however, was dismissed as impracticable. But Dr. Mixter remembered his boyhood, and from the leather seat of the fisherman's breeches fashioned a disc, through the center of which he passed a string secured by a knot. This sucker, thoroughly moistened, he applied with firm pressure to the stone, which he then gleefully and triumphantly delivered by traction on the string, aided by expulsive defecatory efforts on the part of the ancient mariner, — who freely forgave the impish damage to his trousers, and expressed his gratitude by the much appreciated gift of a bottle of 1842 Medford rum.

The stone and sucker were presented to the Warren Museum, where they were long preserved to the glory of God, the memory of Dr. Mixter, and the admonition of all fishermen and other sufferers from haemorrhoids.

on to say that Dr. John Warren, professor of anatomy and surgery, was rather alarmed when he heard of this escapade, but when he saw what a fine subject it was, he could not help being well pleased. The body lasted throughout his course of lectures. (It may interest you to know that the tuition was $20 and the cost of living for medical students in Boston at that time was $3.50 a week.)

From its founding in 1783 until 1805 the Harvard Medical School could legally offer a course in practical anatomy only in the event of a successful duel. A bold piece of legislation in 1784 called the "Act Against Duelling" provided that the body of anyone killed in a duel could be turned over to a surgeon for dissection if one wished to claim it. In 1805, the bodies of murderers also became available at the discretion of the magistrate, but the duelling and homicide rates in Boston then were too low to meet the needs.

It was only poetic justice that these death masks of Burke and Hare should have ended up among a medical school's assortment of anatomical specimens. From the collection of Dr. J. C. G. Spurzheim (1776-1832), the father of phrenology, they can be viewed in the Warren Museum.

The same year that Dartmouth began medical instruction in 1796, New Hampshire enacted legislation to discourage anatomists from following the most expedient method of obtaining cadavers. This law provided a penalty of $1000, public flogging up to thirty-nine stripes, or a year in prison for anyone disturbing a grave. Other New England states followed this example. But it became evident in the early 1800s that suppressive measures were not the solution to the problem.

In 1827, William Hare and his wife, and William Burke and his mistress were living happily together in Edinburgh where Hare ran a rooming house for vagrants. One of his tenants died, owing the management four pounds. With the aid of Burke, Hare sold the body to a Dr. Knox who ran a school of anatomy — receiving seven pounds and ten shillings. This represented a profit of three pounds ten shillings that was so easily acquired that Burke and Hare immediately formed a partnership to carry on in this trade. Before they were finally brought to justice they had killed sixteen men and women and had disposed of their bodies to the medical school. Their method was simple and direct. Burke's mistress, Helen MacDougal, would entice a likely old alcoholic to the rooming house where he would be plied with cheap liquor until unconscious. Then Burke would smother him by holding his hands over the mouth and nose. Thus no marks of violence were left on the body. They were usually quite careful to choose victims whose disappearance would not attract unfavorable attention, but they made a fatal error when they killed Mary Patterson. Mary worked at the oldest profession then open to women — and she had a very large clientele. When she disappeared she was sorely missed in the community. Furthermore, I regret to say, it was reported that when she reappeared on the dissecting table a number of the medical students recognized her body. In any case, the law closed in on Burke and Hare. The trial aroused international interest and served to direct attention to the need for permissive legislation providing a legal source of dissection material. Incidentally, Hare turned state's evidence and Burke was hanged.

Three years later, in order to remove the incentive to crime and to provide for the adequate education of doctors, Massachusetts, in 1831, passed its first Anatomy Law, making legally available for teaching and research the unclaimed bodies of persons dying in state institutions who would otherwise have to be buried at the public expense. This is still one source of dissection material today. But now, more than a century after passage of this law, there has been such social and economic progress, so much care of the individual, so many special benefits for veterans (and who isn't a veteran of some war?), that the unclaimed and poverty stricken are, fortunately, becoming fewer and fewer.

To replace this dwindling source, the enlightened practice of donating one's body for the advancement of education has become increasingly common. All of our bodies (here at Harvard) now come to us in this way. I tell you this in anticipation of your question — and because as medical students you will be questioned about it by laymen. It is important that you be able to give an informed answer. There is a widespread, erroneous belief that medical schools buy bodies. They do not. Anything you can do to help dispell this belief will be in the interests of medical education.

What is the ultimate disposition of the bodies? The three medical schools of Boston jointly maintain a cemetery, where the remains of each body are buried in an individual grave, with its identity maintained. I am sure I need not remind you that we are obligated to treat the bodies at all times with the respect that we owe to these individuals who were generous enough to arrange, during their lives, for us to have the opportunity to learn from their bodies after death.

Is there danger of contracting disease? No — far less than in dealing with living patients. The bodies are embalmed with fluid containing two strong antiseptics, formalin and phenol. There is no need to wear gloves unless you are specifically allergic to either of these. Phenol is a local anesthetic, so if your fingers become numb or tingle, don't be alarmed — you're not suffering from some dread neurological disease. Normal sensation will return in an hour or so after leaving the dissecting room.

Anatomy of a museum

by R. Ted Steinbock
illustrated and annotated by David L. Gunner

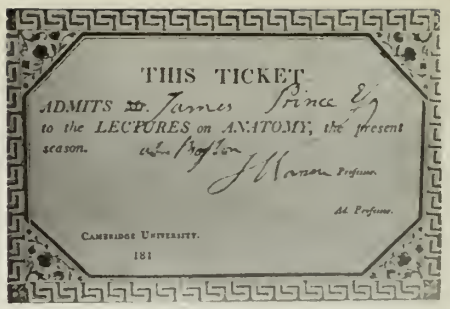
In its halcyon days the Warren Anatomical Museum embodied the grandeur of the architecture of the period — glass floors, elaborate skylights and bronze columns and balustrades, which were built sparing no expense. This view was included in the brochure on the museum compiled by William Fiske Whitney while he was the curator.

Certainly every Harvard medical student climbing the steps of Building A to attend the basic science conferences has noticed the tall glass cabinets on the fourth floor containing hundreds of specimens of gross bone and soft tissue pathology. A profusion of pathological bones is handsomely mounted on wooden bases and the diseased organs preserved in large glass jars. Besides a small exhibit area on the fifth floor, however, only a few cabinets, built seventy years ago, remain; these are too shallow for any useful arrangement of the abundant specimens.

Unfortunately, for most students today this constitutes their sole encounter with the Warren Anatomical Museum, a unique assortment of anatomical and pathological specimens that grew out of the personal collection started over 175 years ago by John Collins Warren, during his years as a Harvard undergraduate. The museum was formally established approximately forty years later. A decreased emphasis on anatomy, changes in teaching methods, and limitations on space have combined to place a once integral part of the Medical School into relative obscurity.

My association with the Warren Anatomical Museum began six years ago as a Harvard undergraduate doing research in paleopathology, the study of bone diseases in ancient human populations. Searching through the cabinets and boxes crammed with specimens, I discovered the wealth of pathologic material and old medical instruments of intrinsic and historical importance. The following chronicle of the Warren Anatomical Museum at Harvard Medical School is presented in the sincere hope that it might inspire a renewed interest in the museum and call attention to the need for continuing improvements.

Professors, including John Warren, one of the founders of the Harvard Medical School, issued tickets of admission to their individual lectures. This procedure continued well into the nineteenth century.


THIS TICKET
ADMITS Mr. James Prince Esq
to the LECTURES on ANATOMY, the present season.
J. Warren Professor
Ad. Professor.
CAMBRIDGE UNIVERSITY.
181

John Collins Warren (1778-1856), Founder of the Museum

After graduating from Harvard College in 1797, John Collins Warren apprenticed under his father Dr. John Warren (one of the founders of Harvard Medical School in 1782) to learn the practice of medicine and surgery. Like many other students of the time, John Collins Warren furthered his education in Europe. He dissected and studied extensively at Guy's Hospital in London and later in Edinburgh, and in Paris under the great French naturalist Georges Cuvier. Realizing the importance of the permanent anatomical preparations widely used in Europe, Warren assembled a small collection which he brought back to Boston.[1] On his return in 1802, he assisted in his father's busy surgical practice, and soon became Adjunct Professor of Anatomy and Surgery at the Medical School. In 1809 he set up an Anatomical Theater and Dissecting Room at 49 Marlborough Street, which provided a constant source of new specimens; this collection was then moved to the new building on Mason Street in 1816.

John Collins Warren succeeded his father as Professor of Anatomy and Surgery in 1815. Together with James Jackson, Professor of the Theory and Practice of Physic, Warren helped establish the Massachusetts General Hospital. His personality was a striking one — strict with himself and exacting towards others. Despite a large surgical practice, administrative and teaching duties, he devoted much time to his anatomical dissections and lectures.

John Collins Warren was painted by Thomas Sully in 1836. This handsome rendering was owned by the Warren family of Philadelphia.

By 1834 the burgeoning collection was in need of additional space at the Medical School, which he provided at great personal expense. In addition he made a special trip to Europe in 1838 to procure more anatomic and pathologic specimens. His son Jonathan Mason Warren also made two trips to the Continent, and paid three thousand dollars for special wax models as well as for specimens of pathology.[2,3]

Notable among the purchases made in France by Jonathan Mason Warren are the papier mâché models designed by Dr. Jerome Auzoux (1797-1878), of which this newborn child is representative. The detail and quality of these preparations still recommend the firm of Auzoux. A number of specimens from the Auzoux studios are in the Warren Museum collection.

In 1847 when the Medical School moved to new quarters on North Grove Street adjacent to Massachusetts General Hospital, a special room was built to house Warren's anatomical collection. Warren retired that year and donated a large portion of his collection plus five thousand dollars' worth of railroad stock for its continued maintenance and improvement. In recognition of this generous gift, the Corporation of Harvard University voted to name the collection the Warren Anatomical Museum. The remainder of the collection, preserved under the name of Warren Museum of Natural History, was sold to the American Museum of Natural History in 1906 — including the famous Warren mastodon skeleton elaborately described by John Collins Warren in 1851, which is now exhibited in the Museum of Comparative Zoology in Cambridge.[15] The Warren Anatomical Museum at that time consisted of 1,116 specimens. An additional number of anatomical preparations had been acquired by the Medical School earlier through the beneficience of Ward Nicholas Boylston, a wealthy philanthropist who had also provided initial support for the Boylston Medical Society, the Boylston Prize in Medicine, and Boylston Hall. John Barnard Swett Jackson, Professor of Pathological Anatomy, was named the first curator of the Warren Anatomical Museum, a position he diligently fulfilled for thirty-two years.

Harvard Medical School in 1847

The Medical School in 1847 was just settling into its new quarters on North Grove Street. It was known as the Massachusetts Medical College in recognition of a large contribution received from the state in 1814, and retained the name until 1883. The Medical School was just a few hundred yards from Massachusetts General Hospital, which only the year before had astounded the world with the use of ether administered by W. T. G. Morton during an operation performed by John Collins Warren.

This view taken in 1853 shows the Massachusetts General Hospital and the Harvard Medical School adjacent to one another — the Bulfinch Building is to the left, and the Medical School to its right on North Grove Street.

Dr. Warren's pronouncement of October 16, 1846 headlines the Warren Museum exhibit on ether anesthesiology. The famous painting depicts Dr. Warren operating to remove a tumor from the neck of Gilbert Abbott, and Dr. Morton observing in the foreground. The detail is from this 1893 painting by Robert Hinkley.

The 139 students were divided into three grades, and seven professors taught courses of lectures on anatomy, chemistry, physiology, pharmacology, materia medica, midwifery, surgery, and theory and practice of medicine. The school year lasted only four months, from November to March, but private summer courses, from March to October were offered by several of the professors for additional fees, under the name of the Tremont Medical School. All of the courses and clinical sessions were finally merged to form a full year curriculum at Harvard in 1857. The tuition of fifteen dollars for each course was paid to each professor. An additional five dollars was required to use the dissecting room, and the diploma cost twenty dollars. Each student was required to attend two courses of lectures in each of the eight areas listed. Many of the courses were integrated with clinical sessions held thrice weekly at Massachusetts General Hospital. Moreover, the students apprenticed under a regular practitioner of medicine for three years. Finally, each student submitted a dissertation on a medically-related subject and defended the thesis before a committee composed of the entire faculty. If qualified, the student received the degree of Doctor of Medicine and became one of the 1,237 physicians who cared for the approximately 980,000 people in the Commonwealth of Massachusetts.

John Barnard Swett Jackson (1806-1879)

Upon graduation from Harvard Medical School in 1829, J. B. S. Jackson studied for three years in London and Paris. On returning to Boston, he worked at the Massachusetts General Hospital as pathologist and physician as well as administering the anatomical collection of the Boston Society for Medical Improvement. In 1847 Jackson was named Professor of Pathological Anatomy and curator of the Warren Anatomical Museum. Under his vigorous leadership the collection burgeoned especially through specimens contributed by Drs. George Hayward, Henry J. Bigelow, R. M. Hodges, and others. Dr. Oliver Wendell Holmes contributed many preparations of healthy human and animal anatomy as well as numerous histologic slides.

In 1870 Jackson published a 759-page descriptive catalog of the museum including clinical observations on the 3,689 specimens listed.[6] The following year the Boston Society for Medical Improvement donated its large anatomical collection of about two thousand specimens to the Warren Anatomical Museum. As an early curator of that collection in 1848, Jackson had compiled an extensive catalog that listed 954 specimens.[7]

Dr. Jackson carried on his research before the general use of the microscope. Dr. Oliver Wendell Holmes wrote of the author of the first printed Warren Museum catalog: "His honest eyes were naked and not even ashamed . . . But what he saw with those eyes was seen clearly and what he told was related faithfully. There is nothing more genuine in all medical literature than the records he has left of what he observed and has bequeathed to those who came after him." — Boston Medical and Surgical Journal, *104:561, 1881. The sculpture of Jackson, by B. L. Pratt, is in the collection of the Warren Museum.*

By the time of his retirement in 1879, J. B. S. Jackson had doubled the original museum endowment. In his honor the Jackson Fund was established in 1906 to underwrite the John Barnard Swett Jackson Curatorship.

William Fiske Whitney (1850-1921)

William Fiske Whitney graduated from Harvard Medical School in 1875, and spent his fourth year as a house officer at the Massachusetts General Hospital. Thereafter he studied anatomy and pathology for three years in Austria, France and Germany before becoming pathologist to Massachusetts General Hospital in 1878.[8]

Whitney became curator of the Warren Anatomical Museum in 1879 and like his predecessor, held the post for thirty-two years. He supervised the transfer of the collection in 1883 to its next location — the new building on Boylston Street. These facilities soon proved inadequate for the growing medical school, and in 1906 the museum was installed in specially designed rooms at its present location in Building A of the Longwood Avenue quadrangle. The collection, by then numbering approximately 11,000 specimens, was handsomely exhibited, and occupied the entire upper three floors of the building.[9]

As a new catalog was urgently needed for the greatly enlarged collection, Whitney planned a series of bulletins to describe the contents of its various groupings. The first — and last — bulletin, published in 1910, annotated new pathological specimens of bones, joints, synovial membranes, and tendons.[10]

Concurrently, Dr. Thomas Dwight, Parkman Professor of Anatomy, collected for the museum an important series on anatomic variants of the human spine, hands, and feet, and helped to arrange them in the new exhibit halls.[11]

The portrait of William Fiske Whitney, second curator of the Warren Museum, is by Ernest L. Ipsen and hangs in the museum. A portfolio of the interiors was published soon after the new arrangement of the collection, which was accomplished with the assistance of Dr. Dwight.

Myrtelle M. Canavan (1879-1953)

After Whitney's retirement in 1921, the Warren Anatomical Museum was briefly directed by a museum committee chaired by S. Burt Wolbach. In 1924 Dr. Myrtelle Canavan was named curator, a post she held for twenty-one years. A pathologist particularly interested in diseases of the central nervous system, Dr. Canavan added hundreds of neuropathological specimens to the museum. She also initiated various programs to extend the use of the museum collection and more effectively utilize the large exhibit area. These innovations successfully competed with the growing popularity of lantern slides in the amphitheaters.

Mr. Harry Fallon assisted Dr. Canavan in maintaining the collection for over thirty-five years. He continued to lead tours through the museum and oversee the collection after her retirement in 1945; administratively, the Warren Museum remained under the watchful eye of the museum committee. Mr. Fallon himself retired in 1972, having spent fifty-two years in assistance to the Warren Museum and to the department of pathology.

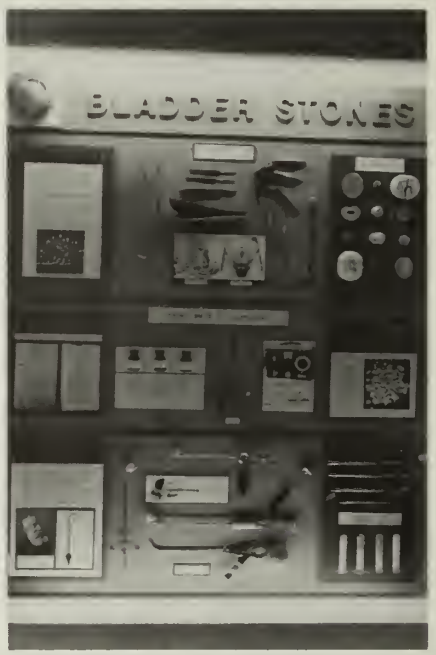
Recent Curators and Changes in the Museum

In 1956 Dr. Paul I. Yakovlev, professor of neuropathology, was appointed curator. Because of increasing demands within the Medical School for more research, classroom and administrative office space, the museum collection was sorted and put into storage. Many of the older, slightly damaged specimens or duplicates were discarded, and some specimens were lost. Portions of the collection were transferred to other institutions which had a particular interest in them. Today, the Warren Anatomical Museum occupies less than twenty per cent of the area originally designed to accommodate it.

The integration of teaching and research facilities within the floor space of the museum took place in the early 1960s: an extensive series of brain sections in cases were placed against the fifth floor rail; neuroanatomy teaching material was displayed lengthwise on the third floor.

In 1961, Dr. Don W. Fawcett, Hersey Professor of Anatomy, became the curator. Dr. George E. Erikson, assistant professor of anatomy, was appointed assistant curator and conducted special classes in the history of medicine at the museum. He also refurbished and modernized some of the displays and facilities. Dr. Charles P. Lyman, professor of biology and curator of mammology at the Museum of Comparative Zoology, became the curator in 1971. Current members of the museum committee, which is greatly interested in efforts to reorganize the museum, are: Dr. Lyman, chairman, Dr. Fawcett, Dr. Arthur Hertig, Mr. Henry Meadow, Mr. Howland S. Warren '77, and Dr. Richard Warren, the great-great-grandson of John Collins Warren. Curatorial associate David L. Gunner has an office/laboratory on the fourth floor, where he is in the process of restoring damaged specimens and designing new exhibits. Mr. Alex Grey, an artist, has helped with construction and placement of material in the refurbished cabinets.

Dr. Charles P. Lyman poses with a statuette from an exhibit of teratological specimens. Second only to his interest in gross anatomy, the study of teratology conducted by Dr. Warren is strongly reflected in the collection today. Under Dr. Lyman's direction, significant improvements to revivify the museum have been made. Members of the Sigma Psi chapter visited the Warren Museum for their March 1977 meeting. During this period of renascence, increasing numbers of medical investigators have utilized the collection, which has copious basic material for the study of morphology, pathology and comparative anatomy. By appointment, area schools and institutions have been treated to tours of the eye-catching exhibits. Educational training programs and work-study experiences benefit a number of high school students and biomedically oriented undergraduates. The Warren Anatomical Museum is a major landmark for visitors to the Harvard Medical School.



The Warren Anatomical Museum's Contributions to Paleopathology

It is interesting to note that the Warren Anatomical Museum has made significant contributions to the field of paleopathology, the study of diseases in ancient human populations. The first American reference to paleopathology was made by John Collins Warren in 1822. In an appendix to his monograph on the comparative anatomy of the nervous system, Warren described the crania of several different ancient American Indian tribes and made comments on artificial cranial deformation.[12] He published a similar study on crania from the mound-builders of the midwest in 1837.[13] Of even greater importance was his detailed description in 1823 of the Egyptian mummy given to the Massachusetts General Hospital.[14,15] (A complete account of the "Ether Dome mummy" is to be found in this issue).

Although a pathologist, J. B. S. Jackson made no mention of diseases of earlier human societies in his papers. However, his successor William F. Whitney published two important articles on paleopathology. In 1883 he wrote "On the existence of syphilis in America before the discovery by Columbus," and discussed the criteria for diagnosing syphilis from dry bones.[16] In 1886 Whitney surveyed the skeletal collections at Harvard's Peabody Museum to write "Notes on the anomalies, injuries, and diseases of the bones of the native races of North America,"[17] which systematically covered most of the common gross lesions of the skeleton.

An associate of Whitney's, Thomas Dwight, donated important specimens of human skeletal anatomy to the museum and published several important papers on anomalies and variations of the human skeleton.[18,19,20] These contributions have earned him the honor of being considered the father of American forensic anthropology.[21]

A sectioned osteogenic sarcoma of the femur. This surgical specimen was donated by Dr. Amory Codman in the early 1900s and closely resembles reported archaeological cases from the Iron Age of Switzerland, Saxon times of Britain, medieval period of Sweden, and ancient skeletal remains of Egypt and Nubia.

Since 1920 interest in paleopathology has declined, at the Warren Anatomical Museum and in the United States in general; but recently a resurgence of interest has been expressed among physical anthropologists. At present, the museum's extensive collection of gross bone pathology is invaluable in defining diagnostic criteria in excavated skeletal remains.[22]

The "Crowbar Skull" is of perennial interest. One Phinias Gage was injured by the passage of a tamping bar propelled by an explosion through the front of his head, from the angle of his left jaw. He survived and was able to work and live nearly normally, although "his disposition was noted to change, but in minor ways. He became fitful, vacillating, obstinate and profane." Gage died thirteen years after the accident, having suffered a prefrontal lobotomy of the crudest form.

Classrooms, administrative offices and research facilities now occupy much of the 26,000 square feet designed in 1906 to accommodate the Warren Anatomical Museum. The glass floors are gone and the expansive skylights are concealed; the elegant bronze balustrades and columns remain. Lights from the new exhibit area on the fifth floor are reflected in the glass fronts of fourth-floor cabinets, where some specimens of bone pathology are stored. The office, laboratories and study rooms of the museum are in back of these original cases.

Other portions of the museum's anatomical and pathological collection are equally valuable for particular teaching and research purposes. The old medical instruments and memorabilia accumulated over the years provide a unique archival resource for those interested in the history of medicine and surgery. Unfortunately, much of the stored material needs attention or is randomly packed in large boxes for lack of space. Yet the painstaking renovation, which has resulted in a bright, attractive exhibition area, continues. Such efforts are vital to maintain and improve the Warren Anatomical Museum for future generations of medical students, physicians and historians.

Recent additions to the collection include a fine microscope manufactured in Paris by Nachet and used by Dr. George Francis Minot. The family of the late Dr. Francis Rackemann was the benefactor. The collection increases only through gifts. Interesting specimens and instruments privately owned might well be considered for public display in the museum.

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"Estamos heridos, pero no de muerte": We are injured, but not fatally wounded

by Noel W. Solomons

Noel W. Solomons '70 is currently an assistant professor in the department of medicine, section of gastroenterology at the Pritzker School of Medicine, The University of Chicago, and a research associate in the division of biology and human nutrition of the Institute of Nutrition of Central America and Panama in Guatemala City. *His research in Central America has been supported by a Macy Faculty Fellowship from the Josiah Macy Jr. Foundation of New York, and a Future Leaders Award from the Nutrition Foundation, New York.*

It is now more than a year since the Guatemalan earthquake, and the country is slowly being rebuilt. Is this article then "old news?" The Bulletin *agrees with Dr. Solomons that such an event should not be so quickly forgotten. And, unfortunately, natural and man-made disasters will continue to recur and to call upon the energy and courage of physicians in helping to meet such emergencies. In this context, Dr. Solomons's account of his part in efforts to restore the health and well-being of victims of the earthquake is still quite timely.*

War and natural disasters are situations which severely test, if not entirely defy, both the logic and the logistics of any system of health care, whether it be traditional medicine or conventional Western medicine. There is limited literature on the medical response to natural disasters; notable contributions, however, have been made by several HMS alumni. Lincoln Chen '68 has edited a compendium, *Disaster in Bangladesh*, about the floods and famine in the eastern corner of the Indian subcontinent, and Roger Glass '72 presented a penetrating account of the relief efforts following the Peruvian earthquake in the *Alumni Bulletin* of January/February 1971.

On February 4, 1976, at 3:04 in the morning, the earth under Guatemala shook with force and fury for thirty-nine seconds. When it abated, 22,000 were dead or dying, 74,000 severely injured, and more than a fifth of the population homeless. The following minutes, hours, days, and weeks were a story of the attempts of this people to grapple with the forces of nature, to recover their health, strength, and composure, and to restore their control over their environment.

Guatemala is the northernmost republic in Central America, bordered by Mexico to the northwest and El Salvador and Honduras to the southeast. It was the original home of the Mayas, and today, greater than sixty percent of its population is made up of Indian descendents of the Maya. Both the face of Guatemala and the history of its people have been profoundly affected by natural events. Across the Guatemalan highlands or *altiplano* and the eastern region or *Oriente* are scattered twenty-three volcanos. The rise of volcanos on the coastal side of the highlands trapped the water which forms Lake Atitlan, one of the world's most spectacular lakes. The Motagua River, a broad, straight waterway, completely navigable by the ancient Mayan canoe, courses along a geological fault which is the inland extension of the Caribbean

Fault, formed at the interface of the North and South American continental plates. Although the mystery remains to be resolved, one theory holds that the migration of the Mayan civilization from the jungles of Guatemala to the plains of the Yucatan was provoked by natural disasters. In the Spanish colonial period, the earthquake of 1773 destroyed the ancient capital of Antigua, Guatemala and caused the Spaniards to abandon that site for the present location. Another series of quakes began on Christmas Eve, 1917, and continued into January of the following year. These twentieth century earthquakes caused extensive structural damage in the present capital. Finally, volcanic eruptions, floods on the Pacific plain, and hurricanes and tidal waves along the Atlantic coast are commonplace events in the contemporary geological and meteorological life of the country.

I had come to Guatemala in January of 1975 after completing eighteen months of training in clinical gastroenterology at the University of Chicago. I then came to work at Institute of Nutrition of Central America and Panama (INCAP) in Guatemala City. The Institute is a subsidiary of the Pan American Health Organization and the ministries of health of the Central American republics. It was founded twenty-six years ago under Dr. Nevin Scrimshaw, the current head of the department of nutrition and food sciences at MIT. Since that time, it has remained in the forefront of international nutrition research, with investigative activities covering a spectrum from agricultural and food sciences to clinical and experimental nutrition.

In the wee hours of February 4, I was abruptly awakened from my sleep by intense shaking and loud rumbling. My first observation was the flickering light on the face of the alarm clock — it read 3:04 — then, blackout. I was next aware of crashing glassware in the kitchen. I leaped out of bed, but was unable to gain my footing due to the violent gyrations. I crawled to my bedroom door, righted myself with the aid of the doorknob, and fled through the front door just as the initial thirty-nine seconds of seismic convulsion were elapsing. Repeatedly throughout the morning, aftershocks were felt. I spent the rest of the night in the camper on top of my Jeep stationwagon.

As none of the well-built houses in my immediate compound had suffered any damage, I was unprepared for the extent of destruction in the city and in the countryside that was to be revealed by the light of day. Thus, as I lay in the camper, wondering when water and electricity would return to our otherwise safe and comfortable homes, at the Roosevelt General Hospital some twelve blocks away, a mammoth traffic jam was developing out of the crush of assorted vehicles from the slum districts of the capital carrying the gravely injured, the dead, and the dying. It was the lower classes who bore an overwhelmingly disproportionate share of the death, injury and dislocation. I lay in my camper unaware of the screams that were rising throughout the city. At the Roosevelt Hospital, too, there was neither electricity nor water; what was an inconvenience for me, became a life and death issue for the injured arriving at the emergency room. In the maternity hospital wing, a Caesarean section was in progress when the earthquake struck. The baby and placenta had just been delivered as the ground began to move. The lights went out. The darkness in the obstetrical operating room was broken by a flash of light emanating from the INCAP campus three hundred meters away. The falling of chemical solvents had resulted in an explosion and fire in the main laboratory building and red flames roared toward the sky. Back in the O.R., the uterine repair and abdominal closure were accomplished by the dim light of headlamps.

Top, the fire-gutted laboratory building at the Institute of Nutrition of Central America and Panama (NCAP). Above, the rubble of San Pedro Sacatepequez left by the quake.

The ten minute drive to INCAP that morning gave me the first inkling that all was not well in Guatemala. Walls had tumbled into the streets. Adobe houses in the poor neighborhoods had crumbled to dust. The recuperating malnourished children of our Clinical Research Center were now camped outside on the lawn and seemed oblivious to the distractions all around; the team of terrified nurses who alone had seen after the nine children throughout the night welcomed the relief of the day shift.

The real shock for everyone came when we learned that the reference library, INCAP's treasure and possibly the finest scientific collection in Central America, which was located in the wing adjacent to the explosion, had been damaged by the heat, smoke and water. Moreover, the weight of the books threatened to collapse the structurally weakened second story. A brigade of employees formed a human chain to pass the remaining volumes to the street below. The force of the quake had swept chemicals and reagents from their shelves in all laboratories. At the far end of the same building, I worked amid the acrid fumes of sulfuric, acetic and perchloric acids to try to salvage some equipment. Collections of frozen samples representing years of work had been defrosted and lost in the electrical power failure. Uncertainty, shock, and stunned disbelief were on the faces of everyone who viewed the INCAP campus. Some openly wept.

The capital was indeed now isolated from the countryside. Fear of food and gasoline shortages swept the city, and hoarding began. Vegetables from street vendors rose to black market prices; long, unruly lines formed outside the few open supermarkets; by afternoon, service stations were rationing gasoline, and by nightfall there was none. Conversely, the countryside was isolated from the capital. Medical supplies, food and personnel could not be moved overland. The present highway system of Guatemala is built along the path of the original Mayan trails, and massive landslides had occurred in almost every mountain pass. Landing strips were created out of straight stretches of asphalt covered highway, and volunteer pilots from the private Air Club used their light aircraft to transport supplies. The severely injured had to be evacuated in the few available Guatemalan air force helicopters to the already bulging and understaffed hospitals in the capital. The most severely affected highway was the route to the Atlantic (Caribbean) coast which runs parallel to the Motagua River (and the Motagua Fault). The *Aguacaliente* Bridge, a major span twenty-nine kilometers from the capital, had crumbled, cutting the only access to the *Oriente* and the Caribbean ports.

All during the first day, our only news of the catastrophe came over battery-operated radios from a station in Honduras. By late afternoon, electrical service had been restored in most of the capital. At 7:00 P.M., a tired, haggard General Kjell Laugerud Garcia, President of the Republic, went before national television to report to the nation after a day spent touring the affected areas by air with a team of photographers. We were finally to realize the full magnitude of the disaster when we saw the aerial photographs of rural community after rural community with not a single building standing and their huge, beautiful colonial churches reduced to clay dust. In his telecast, the President recited the first death and injury tolls: both were to rise twenty-five-fold before the full extent of the tragedy would be known. However, the speech contained more; it contained hope, the message that outside aid had begun to be offered from countries around the world. The President went on to inspire the nation with the words which were to become slogans: *"Guatemala esta en pie!"* (Guatemala is on her feet!), *"Estamos heridos, pero no de muerte."* (We are injured, but not fatally wounded.) The recovery had hesitantly begun.

For two days, I awaited the master plan for concerted, coordinated relief efforts by the physicians of INCAP. It never came. By the third day, roads were beginning to open up. Although it had been years since I had worked in an emergency room, I felt I could be most useful in the rural areas where medical attention would be scarce. Dr. Roberto Garcia, the Guatemalan pediatric resident at our Clinical Research Center, and Ms. Nancy Butte, an American Peace Corps volunteer nutritionist, helped me load my Jeep Cherokee with tanks of potable water and available medicines, and the three of us set off for the town of San Raimundo. The ostensible mission was to investigate the medical situation of the employees of INCAP's experimental farm. En route, we passed through the twin communities of San Pedro Sacatepequez and San Juan Sacatepequez. The scene was one of abject desolation. There was not a house to obstruct one's view for as far as the eye could see. Pulverized adobe lay inches thick on the ground. The indigenous residents seemed at times to be purposelessly wandering around on the remnants of their houses as if in a daze. These had been two of my favorite market towns; the previous spring I had enjoyed watching Holy Week processions wind through the main streets from their gigantic churches. Now, these churches were only foundations, and the streets, a sea of clay colored dust.

When we arrived at San Raimundo, we found a number of problems. There was no safe water, not for drinking, nor for cleaning wounds. The air was thick with swarms of flies; cadavers in the cemetery had been disinterred by the earthquake, and army units were busy digging graves to rebury the dead. The rural health team had evacuated the village health center for fear that an aftershock tremor would send the remaining wall of the church onto the fragile tin-roofed building. A makeshift tent on the soccer field served as a temporary medical station. We filled every available container with our water supplies, gave them what injectable analgesics and antibiotics we could spare, advised them to have the people boil all water and dig latrines, and promised to try to recruit volunteers to help with a vaccination campaign they had planned for the following day. We later learned that the vaccines did not arrived the next day, or the next, and when they finally did arrive, they were insufficient in variety and quantity to meet the needs of the community program.

As we climbed back aboard the Jeep, a man on the field solicited our attention. He asked if we could offer medical aid to a family in his nearby hamlet that had sustained major injuries. We agreed, took him along as a guide, and descended the winding dirt road to the hamlet. The final three hundred meters to the compound could only be made on foot. The main house was now nothing but a tile roof resting on the ground. That anyone had escaped at all was a wonder. We found the injured huddled in a small cornstalk shed and asked the head of the household if he had been injured. He gave a reserved reply. Dr. Garcia asked him to demonstrate his gait by walking. He grudgingly complied, evincing a severe limp, and hobbled back to his seat. The neighbor indicated to us that the *senora* had been even more seriously injured. We en-

tered the hut and addressed the seated woman in Spanish. No reply. The resident asked, *"Hablas castilla?"* ("Do you speak Spanish?") When Dr. Garcia offered to examine the Indian woman, her husband became indignant and shouted "Do not lay your hands on us! . . . we are treating ourselves among ourselves." We were never to discover whether fractured bones lay beneath the bruises on the woman's ankle. The neighbor who had been our guide showed obvious chagrin at having brought us so far.

In our experience in the Mayan Highlands following the quake, this was not to be the only time that "Western medicine" would be rejected by indigenous Guatemalans whom we attempted to treat or examine. Superstition and fear of the white coated practitioner run deep in rural Guatemalan Mayans. The confusion and desperation after the earthquake broke down these barriers for many highland Indians who came or were brought to the hospital centers, but for others, these same factors only strengthened them.

Our base of operations for five days was the large encampment on the soccer field of San Juan Sacatepequez. The Honduran Red Cross had arrived on the second day with ambulances, tents, medical supplies and equipment and personnel. Cadets from the Guatemalan Military Academy were on hand to maintain order and to perform heavy tasks, and a corps of army engineers was also based there. The main hospital tent was under the supervision of a young Guatemalan surgeon, with an ever-changing cadre of medical students from the University of San Carlos Medical School, who varied widely in their medical preparation and abilities. Dr. Garcia and myself were the only other M.D.'s on the premises besides the surgeon. The Honduran physicians worked in a separate tent which also housed a portable x-ray machine and the inpatient quarters. Unfortunately, at the beginning, the coordination of activities between practitioners of Guatemalan origins and those from the neighboring republic was poor. There were also nurses at the encampment, primarily local staff from the destroyed San Juan Hospital. The main hospital tent contained sufficient supplies of gauze bandages, sterile dressings and intravenous fluids for our immediate needs. Parenteral antibiotics were limited to penicillin; injectable analgesics were in short supply, and muscle relaxants and tranquilizers nonexistent. We had hyperimmune anti-tetanus globulin, but no tetanus toxoid. Our major all-purpose drug — we had thousands of tablets — was aspirin. The tent had two wooden chairs, two filthy mattresses and a straw mat as well as a rickety surgical table for patient examination and treatment. There were no cubicles, no privacy. All the supplies were heaped into piles in the back of the tent. The dirt floor was littered with foul-smelling cotton and gauze, used to clean infected wounds. Two lightbulbs hung from the ceiling, served by a noisy gasoline generator, allowing us to work after dark.

The case load each day at the San Juan medical station was steady at about two hundred visits. Patients came by all forms of transportation including chairs strapped to men's backs. About half the cases were traumatic: head wounds, fractured collar bones, dislocated hips, rib fractures, compound fractures of the extremities, and lacerations. The majority of the open wounds were already suppurating. There was one premature birth with precipitous delivery in the medical tent; the infant died within a matter of minutes. The most dramatic case was a man with a pneumothorax secondary to rib fractures. When the subcutaneous emphysema was finally recognized, I volunteered to transport him to the general hospital in the capital. It proved to be a nerve-racking dash over pitch black roads; a race against a shifting mediastinum and progressive dyspnea.

Our major fear was epidemic disease. We encountered a twelve-year old girl with fever and malaise who showed classic Koplik's spots in her mouth and raised the specter of a major measles epidemic. We instructed her father to isolate her and her siblings from contact with other children. We later were to learn of a limited outbreak of measles in the neighboring city of San Pedro Sacatepequez, with several deaths from measles pneumonia.

I noticed progressive improvement in the health services during the five days I spent at San Juan. First, the nurses started a pharmacy and moved all but injectable and emergency drugs out of the recesses of the main tent into the open. Patients were then given written prescriptions for oral medicines. Next, a tarpaulin shelter was appended to the rear of the main tent to provide an area for nontraumatic complaints and for patients returning daily for antibiotic injections or local debridement of wounds. Thus, for the first time, a system of triage was introduced. Moreover, communication and working relations with the Honduran medical team were improved, and they were fully integrated into the treatment activities of the main tent. At the distant corner of the soccer field, a latrine trench and a refuse pit were dug. Each improvement made life and work at the encampment a little easier and more pleasant for us and for the patients.

The other equally important health task there in the early days after the earthquake was food service. Nancy Butte had accompanied Dr. Garcia and me with the original intention of acting as a medical aid, but when word got out that she was a nutritionist, she was immediately put in charge of the food service for the entire encampment. The relief volunteers required feeding, as did the inpatients held over for medical observation. Pits had been dug, firewood gathered, and local women were working in the makeshift kitchen in exchange for food for their families. Celia Cheth, an employee of the city administration of San Juan who was perfectly bilingual in Spanish and her native Cachiquel, was the leader of the kitchen crew. A tent had been set aside as a food storage warehouse and foods for the community came from many sources: canned foods had arrived from Mexico by trucks; the owner of a local soup company had supplied cases of soups; our fellow workers at INCAP were scouring the agencies in the capital — CARE, Catholic Relief, Guatemalan Department of Agriculture, and the Emergency Committee — for dried foodstuffs. As potable water was unavailable and cooking utensils scarce, it was decided to provide "soup kitchen" distribution of cooked meals to the population at large. Three such meals were served to the people of San Juan. Over a thousand men, women, and children passed in orderly lines as oatmeal mush or hearty soup was ladeled into whatever containers could be found.

Distribution of soy-fortified sorghum grits to the people of San Juan.

As the days went by and water became available, portions of dried commodities such as powdered milk and soy-fortified oats were distributed instead of precooked meals. Ms. Butte was also active in instructing women in the boiling of water and the preparation of unfamiliar foods, and in distributing powdered milk and baby formula to the many mothers who complained that their milk had dried up from the emotional shock of the earthquake. Fortunately, the corn harvest in the *altiplano* and *Oriente* had just been gathered prior to the disaster. The food was often buried in the rubble, but with some brief assistance from the food distribution prograjs, the residents could dig out their supplies and recover the majority of the corn and beans, the mainstays of the rural diet.

The second weekend after the quake, I was confronted with the problem of medical care and food service delivery in the most remote rural areas. Two Native American medics from the Seattle Indian Health Board who had brought supplies from the UCLA School of Public Health, two nurse auxiliaries, Dr. Garcia and myself, and assorted nonmedical personnel from INCAP formed a mobile aid team. We headed north along the Pan American highway to Tecpan, the second largest municipality in the Chimaltenango Province. It had been completely destroyed, leveled. The Costa Rican Red Cross and the Guatemalan Army Medical Corps had set up a food distribution and field hospital on the plains of San Lorenzo below the town itself. There we encountered the village chief of a remote hamlet and his son, who had hiked to the San Lorenzo encampment to seek aid for their people. They had received several hundred pound sacks of corn and beans, but now had no way to transport them. The chief told of a number of unattended injured among his citizenry. We loaded him and his son, the goods and ourselves into the jeeps and headed for his village.

It proved to be remote, almost inaccessible. With low gear four-wheel drive, we still had to unload all of the passengers to climb the steep, rocky inclines which led to the hamlet. The panorama from a plateau above the village was breathtaking: one could see the volcanos of Agua, Fuego, Acatenango, Toliman, Atitlan, San Pedro, and Santa Maria. We set our medicine on the tailgate, and announced an impromptu sick-call. Patients with eleven-day-old lacerations, contusions, fractures and dislocations appeared. Aspirins were freely dispensed for minor traumatic complaints and as tranquillizers. We encountered one man with a dislocated humeral head and intense spasm of his deltoid muscles; the usual orthopedic maneuvers only intensified his pain. Failing to relocate his shoulder joint, we took him with us when we returned to the San Lorenzo encampment, arriving just as darkness fell.

The following day, Sunday, we accompanied another village chief to yet another remote hamlet; the story was a repetition of the previous day. For those living near the large population centers, access to relief seems to have been relatively easy to obtain at least by the end of the first week. But no one knows how many sick and injured in mountain-top hamlets, such as the ones we visited nearly two weeks after the quake, went for several weeks or months without receiving medical attention other than local traditional medicine.

Guatemala's recovery

Reconstruction is proceeding, but not at an even rate throughout the country, according to Guillermo C. Sanchez '49, an assistant professor of medicine at HMS and member of the *Bulletin*'s editorial board who maintains close ties with his native Guatemala. Citizens and organizations of Guatemala and the other countries that responded with aid have each been assigned responsibility for the rehabilitation of one village or locality. The funds contributed by members of the Harvard Medical community through the Pan American Society of New England have provided construction materials so that the residents of two villages could build new homes. This work is still going on, says Dr. Sanchez, and inquiries and contributions can be directed to the Boston Guatemala Relief Committee, P.O. Box 186, West Newton, Massachusetts 02165.

It is difficult to draw comprehensive and certain conclusions about the factors that characterized the pattern of death and destruction seen in the Guatemalan earthquake. Certainly, the time of day was important. Most people were inside their homes asleep at 3:04 A.M. Thus, one's health and survival depended in large measure upon the quality of construction of the house and upon the vagaries of direction and force of falling walls and roof. The majority of houses in the *altiplano* and *Oriente* were constructed of plaster-coated adobe, with clay tiles on a wood frame as a roof. In general, adobe showed little resistance to the force of the quake. The walls either cracked and fell under the weight of the roof, or, in some instances, crumbled to dust. The pitch darkness of the hour no doubt hampered immediate rescue efforts by neighbors and family members for those trapped beneath fallen debris. On the other hand, the absence of pedestrian traffic in the downtown areas or of vehicular traffic on the highways at that early predawn hour prevented other types of death: deaths due to outward falling walls, cornices, and buttresses of commercial buildings, or to vehicles buried in landslides. Had the earthquake occurred during daylight hours, it is probable, too, that some vehicles would have been passing over the Aguacaliente Bridge when it tumbled several hundred feet to the bottom of the gorge. The majority of deaths and injuries, therefore, were among the dwellers of the more poorly constructed houses. Thus, in the aftermath of the tragedy a joke went around, a riddle both cruel and ironic which asked, "Why was the earthquake in Guatemala like a Western movie?" The answer: "Because only the Indians got killed."

Foreign emergency aid was forthcoming from thirty-five nations around the world. One of the sour notes for me was the interference of political considerations with humanitarian efforts. Guatemala is locked in a struggle with Great Britain over the sovereignty of Belice (formerly British Honduras), a British colony bordering Guatemala's Peten province. Official aid from the British government or affiliated relief groups was refused. A group from Oxford, however, was finally allowed to participate in the relief effort after assuming a pseudo-address in Indiana, USA. It has been widely rumored, although neither officially confirmed or denied, that a squadron of Cuban relief planes was also refused landing rights and turned back by the staunchly anti-Castro Guatemalan military authorities. A friend sarcastically commented that they were afraid the Cuban vaccination campaign might include "injecting Communism" into the children. Ironically, two months after the quake, the Guatemalan and Cuban soccer teams exchanged home-and-home matches in the Olympic preselection trials.

I have compared my experiences in and reflections on the Guatemalan earthquake with those of Roger Glass on the Peruvian earthquake of 1970. I find both notable similarities and notable differences. Both countries have a numerically superior but economically subservient Indian population, exploited and dominated economically, politically, and socially for centuries by the Spanish descendent minority. Spanish is not the first language of either country's indigenous population. However, while Dr. Glass encountered few among the Incas of the Callejon valley who spoke other than their native *Quechua,* Spanish is widely spoken and understood in the Guatemalan highlands, where *Quiche* and *Cachiquel* are the native dialects. Language did not prove a major barrier, therefore, to communication between patient and practitioner, relief worker and victim in Guatemala.

The belief systems regarding natural phenomena and Western medicine proved to be remarkably similar in the two countries. The earthquake was widely seen as a *castigo de Dios* (the punishment of God) for the people's sins and misdeeds. Moreover, mistrust and ultimately rejection of Western medicine and urban hospitals were common among both the Inca peoples of Peru and the Mayans of Guatemala. In both countries it was hard for the Western observer to measure the impact of traditional medicine during the aftermath of natural disaster.

Adobe construction, common to both Peru and Guatemala, caused most death and injury. Food assistance was the primary activity of international relief groups in both countries, but I share the impression of Dr. Glass that despite the temporary loss of food stores and utensils among the rubble, and the interruption of normal water supplies, starvation and dehydration were not among the major health problems.

Roger Glass's activities were exclusively in the most remote regions of Peru, a vast nation; Guatemala is compact. The areas affected by the Guatemalan earthquake included major population centers along the Pan American highway. Although helicopters and air drops were necessary in some locations, aid could be delivered overland in most instances, and most Guatemalan hamlets were within a day's journey on foot of a municipality having some form of medical aid and food distribution. However, it was my experience that few but the boldest or most desperate rural residents ventured out of their hamlets to seek the available aid. And perhaps because Guatemala had so many highly visible urban disaster areas, less attention was paid here than in Peru to the "invisible" villagers in the mountaintop hamlets.

Roger Glass concludes his analysis with cost-efficiency considerations for disaster relief in the Peruvian earthquake, and feels that the main effect of the helicopter airlift into the Callejon de Hualays valley was psychological support — very expensive psychological support. One cannot, however, discount the tremendous psychological impact for the ravaged earthquake victims of knowing that they are not alone, when they cannot even be sure of the ground under their feet. The presence of relief workers and rescue activities gives assurance that no matter how much the earth shakes and the mountainsides slide and cracks open up in the land, some attempt at aid will be forthcoming. The emphasis in the aftermath of the Guatemalan earthquake in my view, however, was tangible aid: teaching hygienic measures; transporting the gravely injured; managing the simple injuries with straightforward, practical approaches; distributing prepared and dry food. The recovery was rapid in the beginning, and has been rapid in its evolution, spurred by the impending rainy season and the need to have at least dry shelter by the beginning of May. This goal was largely accomplished. The prediction of President Laugerud in his telecast on the day of the earthquake has been validated. Guatemala was not fatally wounded by the quake. *Guatemala esta en pie!*